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Remotely Piloted Vehicles in the Third World: A New Military Capability

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An Intelligence Assessment

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GI 86-10060
August 1986

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An Intelligence Assessment

This paper was prepared by [redacted], Office of Global Issues. Comments and queries are welcome and may be directed to the Chief, International Security Issues Division, OGI, [redacted]

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Remotely Piloted Vehicles in the Third World: A New Military Capability

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Key Judgments

Information available as of 28 July 1986 was used in this report.

The successful use of remotely piloted vehicles (RPVs) by the Israeli military during the 1982 Lebanon conflict and the promise of an affordable unmanned reconnaissance and electronic warfare platform have heightened Third World interest in RPVs. In response to increasing US, West European, Soviet, and Israeli experience with RPVs, several Third World states, including Syria, Nigeria, Pakistan, India, South Korea, and Egypt, have recently purchased, or are planning to purchase, them. We believe a number of other Third World nations with relatively large and professional militaries will become users of RPVs by the mid-1990s, especially with the development of inexpensive and easy-to-use systems. RPVs will provide enhanced surveillance capabilities and, depending on the particular system purchased, provide a capability to jam enemy communications, detect and destroy surface-to-air missile batteries, and deliver standoff munitions.

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US security interests in the Third World will face new challenges from the proliferation of RPVs:

- *Military Capabilities.* RPVs are likely to enhance the capabilities of professional Third World militaries when used in combat. Israeli use of RPVs against Syrian SAM sites in Lebanon showed the tactical advantages of RPV use by a well-trained and resourceful military.

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For nations in the Third World facing insurgent threats, RPVs could improve intelligence capabilities, an area where many Third World militaries are weak. Effective use of RPVs in the Third World will be constrained by shortages of technically qualified personnel to operate the complex systems.

- *Strategic Capabilities.* We believe RPVs could become a source of remote guidance and navigation technologies to Third World countries aspiring to build strategic missile systems, such as India, Argentina, Brazil, South Africa, South Korea, and Israel. Adapting RPV technologies would, however, require additional technical assistance from supplier states.

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- *Terrorism.* A bomb-laden RPV provided to a terrorist group by a patron state could be used against a US embassy or other target in a dramatic fashion. Although we have no indication that any Third World nation or terrorist group is planning such a modification, operators of RPVs can replace the surveillance equipment with a high-explosive payload, effectively converting the RPV into a guided bomb capable of surprise attacks at short and medium ranges.

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RPVs, when used as a reconnaissance system, may help prevent conflict and maintain stability in tense Middle Eastern and Asian areas. RPVs can provide timely intelligence about the buildup of enemy troops and allow increased time for diplomatic action or defensive preparations before the outbreak of hostilities. Reconnaissance missions flown by unmanned RPVs are seen as less provocative than manned fighter aircraft, and the loss of one of these vehicles over the Golan Heights or other sensitive areas is less likely to instigate retaliatory action.

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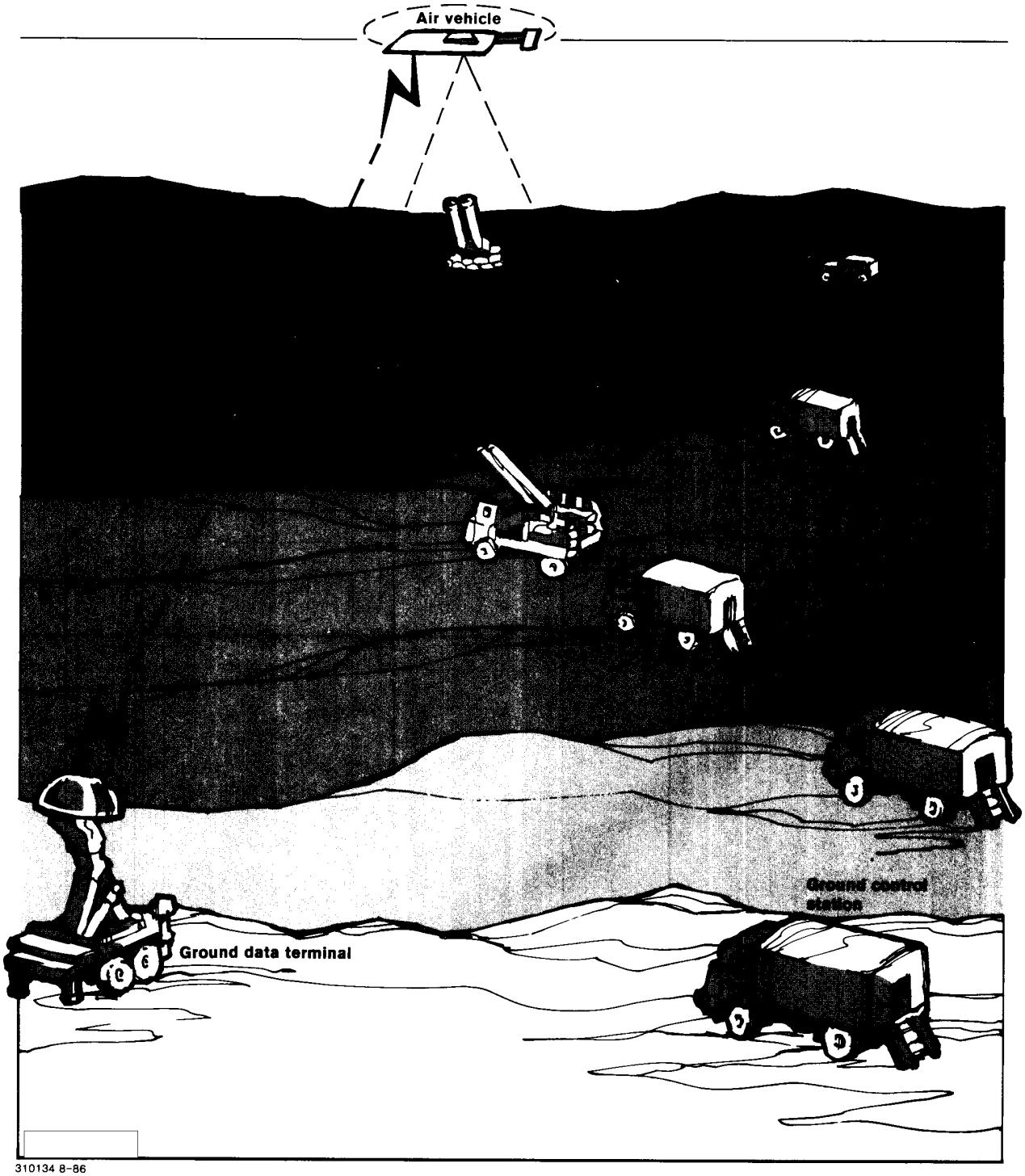
Figure 1
A Standard RPV Field Deployment



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Remotely Piloted Vehicles in the Third World: A New Military Capability

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Introduction

Remotely piloted vehicles (RPVs)[1] are one of several battlefield management systems available to the Third World. Like Airborne Warning and Control Systems (AWACS) aircraft and specially equipped helicopters, RPVs are designed to provide complete and timely surveillance of the battle area to military commanders. Of all the battlefield management systems available today, the RPV is the least expensive and the easiest to operate. The system can easily be modified to perform a variety of electronic warfare and attack missions and is likely to play an increasingly important role in Third World warfare. This assessment examines the status of current RPV programs, projects RPV proliferation into the 1990s, and assesses the impact of their growing availability on US security interests.

The RPV: A Maturing Military System

RPVs have been used in combat as a reconnaissance and electronic warfare platform for over 20 years. The US armed forces flew over 3,000 sorties of early-generation RPVs over Southeast Asia from 1965 to 1972. Israel purchased Firebee RPVs from the United States in the mid-1970s to reconnoiter border areas and minimize the risk of a surprise attack. The Israelis expanded their use of RPVs in the 1982 Lebanon conflict by using them in conjunction with manned aircraft to destroy Syrian SAM sites in the Bekaa Valley (see inset on Israeli RPVs in Lebanon). Both the Syrians and the Israelis monitor developments in Lebanon and on the Golan Heights with RPVs. More recently,

[1] The following study covers RPVs that are recoverable and perform a surveillance or electronic warfare mission that traditionally would be handled by a manned aircraft. Target drones used to train air defense units and expendable attack drones are not included.

Most RPVs available today are small vehicles, or "mini-RPVs," weighing between 100 and 300 kilograms (kg) and capable of carrying a 20- to 150-kg payload of cameras and electronic equipment. RPV development programs have concentrated on small, subsonic vehicles because they are harder to detect than earlier generation RPVs as a result of their reduced infrared, noise, and visual signatures. Manufacturers are taking advantage of many recent technologies such as lightweight but durable special materials and miniaturized electronic components to improve the capabilities of mini-RPVs (see inset on RPV Technologies). A second class of midi-RPVs, weighing up to 2,000 kg, can carry up to a 500-kg payload and have a longer range than the smaller mini-RPVs.

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Unlike their predecessors, RPVs today are designed to perform a variety of reconnaissance, electronic warfare, and attack missions:

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- The cameras used in most RPVs provide real-time or near-real-time information, whereas traditional, manned reconnaissance systems and early-generation RPVs often involve a considerable delay to develop the surveillance photography. Moreover, RPVs can be flown over battle areas during high-intensity conflict when manned aircraft cannot be used because of the likelihood of losing a pilot and an expensive aircraft.

- In addition to its surveillance role, the RPV is a flexible platform; it can carry equipment to jam enemy communications, detect and destroy surface-to-air missile sites, correct artillery fire, or deliver standoff munitions.

- RPVs are also gaining wider acceptance as a laser designator for the new generation of laser-guided munitions, such as the US Hellfire antitank missile and the Copperhead artillery round.

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Israeli RPVs in Lebanon

The Israeli Air Force and Army considerably improved their tactical capabilities by using RPVs during the Lebanon conflict in 1982. The most dramatic incident occurred on 9 June when RPVs, standoff jamming aircraft, and fighter aircraft destroyed 19 Syrian SAM sites in the Bekaa Valley. RPVs were also employed by the Israeli Army for surveillance and target identification missions. [redacted]

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Mini-RPVs contributed significantly to Israeli tactical successes during the conflict. As a result, the Israelis plan to increase their RPV force substantially. [redacted] *In 1982, division commanders had to wait up to two hours before receiving evaluated intelligence from RPVs. Israeli artillery commanders are also evaluating RPVs to spot and correct artillery fire. Furthermore, the Air Force is working on a mini-RPV called Harpy that should enhance Israeli operations against mobile SAM threats in the future.* [redacted]

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RPVs are attractive to Third World militaries looking for improved reconnaissance and electronic warfare capabilities. Most RPVs do not require runways for launch and recovery. Some can be launched by hand, while others are launchable from aircraft, ships, or specially designed mobile platforms. RPVs are typically retrieved in nets or are parachute recovered to reduce the damage to their valuable electronic payloads from runway landings. [redacted]

Current Producers and Users

United States

Most of the development of RPVs is taking place in the United States and Western Europe. US industry is involved in 15 programs, and most of these are in the development and testing stages (see appendix).

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RPV Technologies

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Much of the growing interest in RPVs today is attributable to advances in composite materials and electro-optical technologies that have broadened the RPVs' capabilities. These new advances make RPVs more survivable on the battlefield by reducing their overall size and weight. Furthermore, new technologies will play a more important role in the future as users seek multimission capabilities in their vehicles.

Airframes

Lightweight and durable special materials are starting to be used more widely in RPV construction. While many RPVs continue to be made from standard aluminum alloys and glass fiber materials, the more capable systems are being made from composite materials. The airframe for the US Aquila, for example, is made from molded and preimpregnated Kevlar 49/epoxy material, and the Sky Eye is made primarily from carbon fiber and Kevlar. These materials provide sufficient weight savings to accommodate multimission payloads by themselves.

Electro-Optical Sensors

The predominant imaging sensor for future RPV payloads will be infrared (IR) line-scanning systems, according to industry reports. IR line scanners can cut through the haze and smoke of the battlefield and can perform effectively at night. IR line scanners in development today are striving to overcome the range and maintenance constraints of currently available systems. According to press reports, line scanners incorporating mercury cadmium–telluride focal plane arrays, such as those used in Honeywell's hand-held model, provide the much higher resolution necessary for long-range reconnaissance.

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TV cameras will continue to be a standard surveillance payload, especially for inexpensive and less complex short-range RPVs. Third-generation low light level TV cameras are under development and promise to offer high resolution pictures under starlight conditions. According to industry reports, the development of solid-state cameras has made TV a less costly and more viable option than IR line scanners for RPVs. Finally, the advent of very-large-scale integrated circuits (VLSI), and the approaching very-high-speed integrated circuit (VHSIC), should dramatically increase the processing speed for data gathered from TV and IR RPVs, making them a more effective force multiplier.

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The Aquila, built by Lockheed Missile and Space Company, and Lear Siegler's Sky Eye are the two most prominent US projects. The Aquila is a multimission vehicle that can acquire enemy targets, adjust artillery fire, illuminate targets for laser-guided munitions, reconnoiter battle areas, relay communications between ground and air units, and jam radio communications. The Sky Eye is also a multimission system, but it can also deliver munitions, such as 2.75-inch guided and unguided rockets.

The US military is just beginning to receive these new-generation RPVs. The Army received 32 Aquilas and nine ground control stations last year and will accept eight more air vehicles this year (see table).

The total planned procurement for Aquila will include another 508 vehicles and 71 ground control stations (GCS) that will be fielded at the division level. Each division will consist of 13 Aquilas and one GCS. In 1984 and 1985 the Army also bought eight Sky Eyes that they launch from airfields at Puerto San Lorenzo and Palmerola in Honduras. We believe RPV use in this low-intensity guerrilla environment may lead to an Army requirement for a battalion-level surveillance capability. The US Navy is using the US Teledyne BQM 74C for reconnaissance purposes and will soon set requirements for a midi-RPV with a

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Current Operators of Reconnaissance and Target Identification RPVs

	System	Number	Supplier
	Scout	65	Israel
	Mastiff	40	Israel
US Army	Aquila	32	United States
US Navy	BQM-74C	10	United States
	Pioneer	21	Israel
West Germany	CL-89	200	Canada
Canada	CL-89	8	Canada
France	CL-89	150	Canada
United Kingdom	CL-89	290	Canada
Italy	CL-89	100	Canada
USSR	DR-3	264	USSR
Syria	DR-3	3	USSR
Nigeria	Sparrowhawk	12	United Kingdom
Switzerland	Scout	4	Israel
Singapore	Mastiff	4	Israel
	Scout	8	Israel

range of 100 to 300 nautical miles capable of imaging, target identification, and real-time transmission in a jamming environment. The Air Force does not currently field an RPV system but is looking for unmanned vehicles to perform electronic warfare missions.

Western Europe

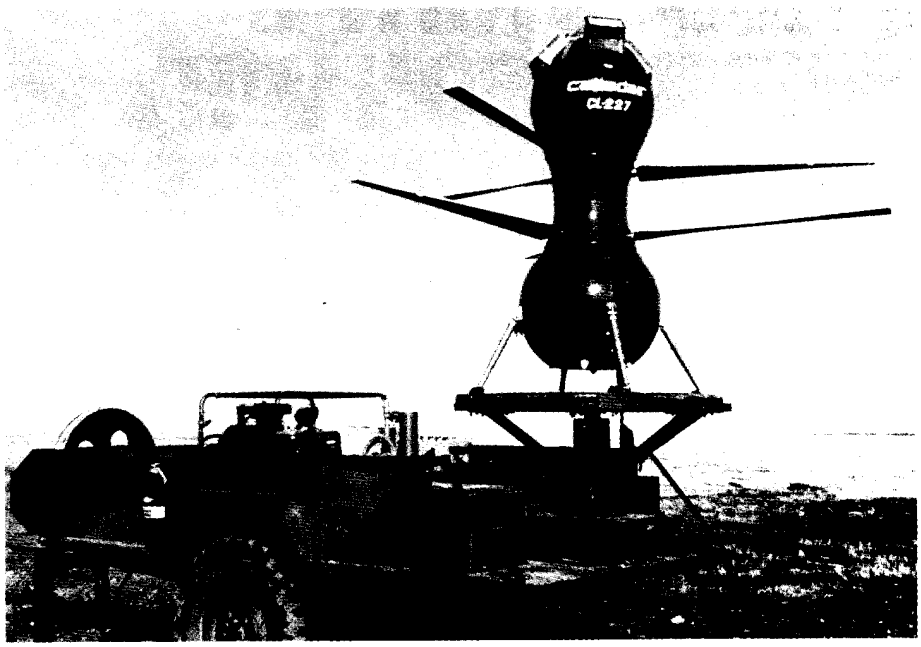
The most widely produced Western RPV is the Canadian CL-89. West Germany, France, the United Kingdom, Italy, and Canada have together bought 748 CL-89s equipped with photographic and infrared line-scanning equipment to provide battlefield intelligence. Canadair is hoping to capitalize on the popularity of the CL-89 and is developing the CL-227, which has a unique peanut shape and takes off and lands vertically. The United Kingdom and Italy account for nearly three-fourths of the remaining 21 programs in Western Europe and are likely to become leading non-US producers. The most prominent British program is the Phoenix, which is entering production and will be used for target acquisition by the British Army; current plans call for the procurement of several hundred beginning in 1988. Meteor in Italy has developed a family of Mirach RPVs for the Italian Air Force that are capable of performing the same missions as the US Aquila and Sky Eye. The Mirach-20 recently entered series production for the Italian Army and Navy. 25X1 25X1

Both West Germany and France have been slow to devote substantial funding to RPV development. The German Army has shown little enthusiasm for domestic programs, preferring to use the CL-89. Nevertheless, Dornier and MBB continue work on the KZO, MTC-II, and Tucan RPVs, mostly on a private funding basis. Recent signs of French interest in the lightweight British Sparrowhawk suggests that the French may forego the research and development risks of RPV development and buy them from other suppliers. The French Army recently gave approval for full development of the Orchidee helicopter-borne battlefield surveillance radar that will perform many of the missions of an RPV, according to press reports. The French Army plans to procure 20 Orchidees by 1993. France's Matra and Thomson-CSF, however, continue to work on the Scorpion, which has yet to fly, missing its planned first test launch in 1983. 25X1 25X1

Soviet Union

The Soviet Union has experimented with drones and RPVs since the early 1950s and currently has three major programs, according to press and military intelligence reports.[2] The DR-3 can perform both photographic and television reconnaissance, has a 25X1

[2] Unmanned Soviet reconnaissance vehicles are often referred to as drones by industry experts because they fly a preprogramed flight path that can be overridden by a ground control station operator. We have included Soviet drones in our study because they meet a military requirement similar to Western RPVs and they have an element of control from a remote station. 25X1



The Canadair CL-227 can take off and land vertically, thereby reducing the number of support vehicles required. [redacted]

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range in excess of 250 kilometers, and normally flies at an altitude of 1,500 meters or lower. Soviet industry is developing the DR-X-4 to provide real-time video collection; it is launched from a tracked transporter-erector-launcher (TEL) to improve its mobility. The third Soviet drone program is provisionally designated DR-5 and will be able to cover a broader area than the DR-3. Soviet DR-3 is fielded with Soviet forces and has been exported to Syria:

- The DR-3 was first deployed with Soviet units in the late 1970s—12 reconnaissance squadrons use 12 air vehicles each.
- [redacted]

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Third World

Israel is the leading RPV developer in the Third World and has more systems in production than any other nation. We believe Israeli industry is well suited to produce RPVs given the technological skill of the work force at Israeli Aircraft Industries and their extensive experience manufacturing miniaturized electronic components for aircraft. Israeli Aircraft Industries and Tadiran Electronics produce three RPVs—the Mastiff, the Pioneer, and the Scout. The Israeli Air Force is currently helping with the development of the "Harpy" mini-RPV that will counter mobile SAM threats that are difficult to track and target, such as the SA-8. Israeli RPVs are used by Israeli armed forces and have been exported in small numbers:

- The US Navy bought 21 Israeli Pioneers for $28.5 million.
- Switzerland bought four Scout RPVs for experimental testing.
- Singapore purchased four Mastiff and eight Scout RPVs that are deployed in three separate squadrons for surveillance missions. [redacted]

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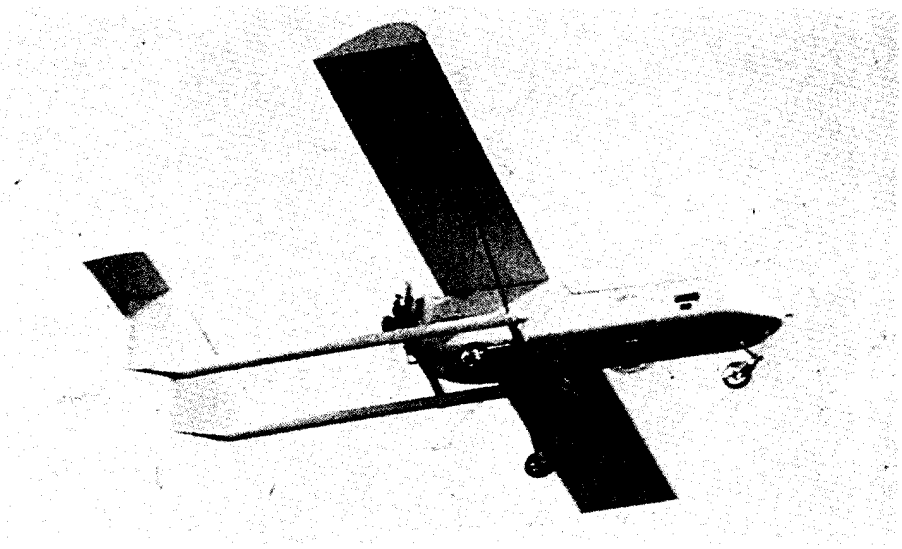
Elsewhere in the Third World, National Dynamics, Ltd., of South Africa is developing the Eyrie multimission RPV capable of firing 2.75-mm rockets. The Argentine firm Quimar builds the Italian Mirach-70

The Israeli Mastiff is a combat-proven RPV that Third World militaries may find attractive. [redacted]



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under license for use as a target drone and will soon begin building a variant of the Mirach-100—designated MQ-2 Biqua—designed to carry out attack and electronic countermeasures missions. The Brazilian firm Companhia Brasileira de Tratores will soon begin producing the BQM-1 BR target, reconnaissance, and attack RPV, according to press reports. [redacted]

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RPV Proliferation in the Third World

Over the Short Term . . .

Many Third World countries are showing an increasing interest in RPVs. We believe greater use of these systems in the United States, Western Europe, and the Soviet Union and the successful Israeli operations during the 1982 Lebanon conflict has stimulated much of this interest. Most of the countries to display interest are conflict states in the Middle East and South Asia that see immediate uses for RPVs in local conflicts or crises:

[redacted]

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- ***Thailand*** recently bought an unknown number of Sky Eye RPVs for patrol missions, according to press reports.

- ***China*** also agreed to purchase 10 Sky Eyes in May for $25 million, according to State reporting.

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- ***Nigeria*** bought 12 Sparrowhawk RPVs from Great Britain in 1984 for reconnaissance missions.

. . . And Beyond

We believe the demand in the Third World for RPVs is likely to continue as more militaries become familiar with RPV usage. The most likely countries to buy RPVs in the 1990s are those fielding large and professional militaries, such as Indonesia, Malaysia, Chile, Peru, Jordan, and Iraq, which can properly utilize sophisticated RPV technologies. Effective use of most RPVs available today demands technical skills that poorly trained militaries would have difficulty overcoming (see inset on Technical and Training Constraints). Purchases by these countries will, however, be influenced by the success of many current programs. The US Aquila project, for example, has experienced several procurement delays, shifting mission requirements, and cost increases over its 15-year development life. While it appears that most of these problems have been solved, any further complications in this program or other high-profile RPV projects, such as the British Phoenix, could dampen further interest in these systems in the Third World. Procurement of RPVs may also fall victim to the recent drop in oil prices and the continuing shortage of hard currency that have already produced at least a 20-percent drop in arms purchases by LDCs.

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Using RPVs in the Third World: Technical and Training Constraints

The effective use of RPVs demands the commitment of highly skilled and well-trained personnel, who are in short supply in many Third World countries. RPVs are complex systems that incorporate many new remote-sensing and surveillance technologies. A typical RPV squadron, for example, requires 10 people to man the ground control station, transport the system from one site to another, and maintain the equipment. Of these 10 personnel, five—the squadron commander, air vehicle operator, mission payload operator, and two maintenance technicians—must have technical experience and be familiar with electronics and communications equipment.

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the mission payload operator should have several years' experience with radar systems, while the air vehicle operator should be familiar with aviation principles to be able to "fly" the RPV properly.

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most of the Israeli technicians operating RPVs over the Bekaa Valley in 1982 had extensive academic and professional engineering experience. Using skilled personnel, initial training on most RPV systems takes two to six months, and full operational effectiveness is not reached for a year after field deployment.

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We believe many Third World countries will be unable to find the qualified personnel to properly operate their RPVs or will be unwilling to detail even a few of their scarce technical personnel from other higher priority missions.

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many Third World militaries cannot maintain their existing fleets of advanced fighters and missile systems, and others, such as Libya and Saudi Arabia, must rely on expatriate personnel. We believe manpower shortages could hurt export sales of RPVs, especially those systems, such as the US Sky Eye and British Hawkeye, that are intended for deployments with smaller battalion or brigade units and require a greater number of technicians to operate the system.

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Costing an RPV

The variety of capabilities, payloads, and construction materials for RPVs has created a wide disparity of procurement costs. The electronics package in most RPV air vehicles accounts for nearly 80 percent of the air vehicle costs and includes the flight controls, data link, and various payloads of infrared (IR) line scanners, laser designators, communications equipment, or electronic countermeasures equipment. The inclusion of two payloads in multimission vehicles, such as a laser designator and surveillance cameras, adds to the costs accordingly. Designers of these more capable systems often build the airframes from expensive lightweight composite materials to reduce the air vehicle's weight, further increasing costs. The least expensive RPVs do not provide real-time reconnaissance data and tend to be made from inexpensive aluminum alloys.

Below, we present comparative cost data on the US Aquila and a less complex hypothetical RPV system that we believe would meet the intelligence collection requirements of many Third World countries. The Aquila air vehicle comes equipped with an IR line scanner for intelligence collection and a laser designator, while the suggested Third World vehicle comes with only an IR line scanner. A small number of laser-guided munitions have been exported to the Third World. The lower cost figures for the Third World RPV reflect the elimination of the laser designator and associated equipment in the ground control station. We have also excluded the need for a maintenance shelter that provides protection in a nuclear, biological, or chemical warfare environment:

Thousand US $

	Lockheed Aquila	*Third World RPVs*
Air vehicle (each)	*800*	*440*
Ground control station	*1,600*	*1,056*
Recovery system	*555*	*250*
Launcher	*500*	*300*
Maintenance shelter	*650*	
Squadron purchase of 10 air vehicles and one of each other item	*11,305*	*6,006*

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We believe RPVs could become more attractive to other Third World countries if less expensive export-oriented models are developed and their utility for missions important to LDCs is clearly demonstrated. Most of the RPVs fielded today are designed for large-scale warfare in Europe or an Arab-Israeli conflict. Stringent requirements for the survivability of RPVs used in West European combat have driven up costs and made the systems very complex (see inset on Costing an RPV). We believe that most manufacturers have failed so far to exploit the RPV's suitability for low-intensity or counterinsurgency warfare where the RPV's intelligence, special operations, and communications capabilities could be very valuable. We believe there is considerable interest in the Third World in a low-cost basic reconnaissance RPV.

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in Cairo. We believe other Middle Eastern, Latin American, or Asian countries facing serious insurgent threats would also be attracted to less expensive but capable RPVs. For example:

- Basic surveillance RPVs could provide valuable information on insurgent movements and activities to government forces in El Salvador, Honduras, or the Philippines.

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- Governments such as Colombia, attempting to interdict arms and drug smuggling activity, would benefit from regular RPV patrols of border and coastal areas.

We believe that the overall demand for RPVs in the Third World will be determined by the organizational level at which they are deployed. The US, South Korean, and Soviet armies field their RPVs at the corps or division level, and we believe that new operators will follow this pattern. Most Third World armies consist of five to 10 divisions, and current deployment planning with existing users calls for an average of 10 air vehicles per division. If RPVs are increasingly used as intelligence gathering assets for counterinsurgency operations, deployments at the brigade or battalion level will be necessary, thereby increasing the number of vehicles needed.

Implications for the United States

Third World Strategic Capabilities

We believe RPVs could become a source of remote-piloting technologies for Third World countries attempting to build strategic weapon systems. Procurement or continued development of RPVs by India, Argentina, Brazil, South Africa, Israel, and South Korea could enhance their abilities to build guided strategic missile systems. Argentina, for example, has purchased missile propellant technologies from the Italian firm SNIA-BPD and is negotiating for the coproduction of an as yet unidentified RPV system under development by Meteor. We believe this RPV would at least have the capabilities of the Mirach-300, which can carry a payload of 150 kg a distance of 900 kilometers. These remote-piloting technologies could be adapted to a strategic missile system, but significant foreign technical assistance probably would be required because of the limited technical manpower available in some countries.

Third World Military Capabilities

When used in combat, RPVs are likely to enhance the warfighting capabilities of professional militaries. The Israeli operations in the Bekaa Valley demonstrated the tactical advantages derived from RPV usage by a motivated and resourceful military organization. Furthermore, South Korea expects to enhance corps-level intelligence resources in a possible conflict with North Korea through the use of RPVs. For nations facing serious insurgent threats, procurement of RPVs could improve their intelligence capabilities, an area where many Third World militaries are weak. By themselves, however, we do not believe that RPVs will prove to be a deciding factor in conflict because more fundamental training, leadership, organizational, and doctrinal considerations play a much greater role in the success or failure of an operation than any particular weapons technology; militaries must respond effectively to the information they receive from their RPVs. 25X1

Third World militaries may attempt to enhance their capabilities by arming their RPVs. Operators of RPVs can replace the surveillance equipment with a high-explosive payload, effectively converting the RPV into a guided bomb capable of flying undetected beneath enemy radar coverage, although there are no indications that any Third World militaries are planning to use their RPVs as guided bombs. The payload weight limitations of many RPVs of less than 60 kg reduce the potential destructiveness of "cruise missile" RPVs.

We believe the RPVs could be a stabilizing force in areas of tension when used to monitor opposing forces. RPVs can provide timely intelligence about the build-up of enemy troops and allow increased time for diplomatic action or defensive preparations to deter an attack. RPVs are also seen as less provocative than combat aircraft fitted with reconnaissance equipment when flying over sensitive areas, such as the Golan Heights. We believe the shooting down of an RPV

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during periods of heightened tension between India and Pakistan, the two Koreas, or Israel and its adversaries is less likely to lead to retaliatory action.

The Terrorist Potential

The proliferation of remote-piloting technologies to radical Third World states, such as Libya or Iran, could pose a new terrorist threat to US interests. Some terrorist groups may be attracted to RPVs in their quest for new and dramatic ways to carry out their violent acts. Terrorist groups in the past have resorted to gliders, rubber rafts, and other unique means to carry explosives to densely populated areas. The RPV would provide a standoff system capable of delivering a sizable bomb accurately. The intense training needed to properly operate an RPV and the extensive support system that helps keep the system in the air, however, would mitigate against RPV usage by many terrorist groups. We believe only the larger Palestinian groups, such as Fatah and PFLP, with large cadres of professionally trained soldiers and links to nations likely to have RPVs would pose a potential threat in the near future.

Exports

Aggressive marketing efforts by key manufacturers will tend to accelerate the proliferation of RPVs in the Third World. We believe US manufacturers of RPVs will be competitive in the export market. US firms collectively offer a wide variety of RPVs with varying costs and capabilities. some Third World military leaders believe that US firms have given piecemeal presentations in the past and, when marketing systems, failed to address such critical issues as unit deployment and integration of the RPV into existing communication networks. We believe that these problems will be resolved as US producers become more familiar with RPV utilization.

Israel, Great Britain, and Canada will offer strong competition. Israeli companies have proven models available for export and can point to the hands-on experience of the Israeli military to enhance its marketing effort. some Israeli RPVs cost as little as one-tenth the price of US models, can easily be adapted to perform a variety of missions, and are less complicated to operate.

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are trying to sell their mini-infrared lines scanners and minilaser target designators to US and West European RPV manufacturers. Canadian and British producers will also try to capitalize on the field experience they gain as domestic armed services become more familiar with RPV technologies. Canadair's CL-227 may become a popular naval RPV because of its ability to take off and land vertically, thereby eliminating the need for special launch or recovery equipment on naval vessels with limited space. British export prospects may be further enhanced by industry-sponsored conferences intended to highlight the global visibility of British RPV manufacturers.

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Third World countries are likely to show little interest in Soviet RPVs, in our opinion. Syria is the only Soviet arms recipient to operate Soviet RPVs, and

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Damascus may be dissatisfied with the system. We believe that the superior reputation of West European and US electronics systems, as compared with Soviet equipment, would prompt some of Moscow's other clients that buy arms from the West, such as Iraq and Libya, to choose West European RPVs.

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The purchase of RPVs by these countries from Western sources would not in itself indicate a shift in procurement patterns, however, because RPVs are bought in small numbers and do not symbolize an arms supply relationship as concretely as the extensive air, ground, and naval weapons Moscow has delivered to its Middle Eastern clients. We believe some Soviet clients fighting insurgencies, such as Angola or Nicaragua, could benefit from the intelligence drawn from RPV overflights of insurgent areas if Moscow provided these systems.

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Appendix

RPV Production Programs Worldwide

	System	Role [a]	Endurance or Range	Payload *(kg)*	Status
Argentina					
Quimar	Biqua-2	R, A, E	900 km	70	Coproduction of Italian Mirach-100.
Brazil					
Companhia Brasileira de Tratores	CBT-BQM-1BR	R	0.75 h		Development.
					25X1
France					
Matra	Scorpion	R			Development; failed to meet initial flight date of 1984.
West Germany					
Dornier-MBB	KZ0	R, TA	3 h		Development.
Dornier	MTC-II	R	2 h	60	Development.
MBB	Tucan	R, TA		50	Development.
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Italy					
Meteor	Mirach-20	R, TA	4 h	50	Production for Italian Navy and Army.
	Mirach-70	EW	1 h	20	Production for Italian Navy and Air Force.
	Mirach-100	R, TA, EW	1 h	40	Production. Used as target drone by Italian military.
	Mirach-300	R, TA, EW	2 h	150	Development.
	Mirach-600	R, ST, EW	2 h	500	Development.
Japan					
Fuji	RPV	R	1 h		Development.

[a] R = Reconnaissance.
ST = Strike.
EI = Electronic intelligence.
TA = Target acquisition.
EW = Electronic warfare.
ECM = Electronic countermeasures.
C = Communications relay.

RPV Production Programs Worldwide (continued)

	System	Role [a]	Endurance or Range	Payload *(kg)*	Status
South Africa					
National Dynamics.	Eyrie	ST, E	160 km	36	Development.
Soviet Union	DR-3	R, E	250 km		Production. Fielded by Soviet troops. Exported to Syria.
	DR-X-4	R	300 km		Development; fielding in 1986.
	DR-5	R	800 km		Development.
United Kingdom					
AEL, Ltd.	Sparrowhawk	R	1.5 h		Production.
ASVEC, Ltd.	Merlin	R	2 h	12	Development.
British Aero.	Stabileye	R	4 h	25	Development.
Buckle	PR 21	R		8	Development.
Eyrie	UMAC	R	160 km	2.5	Development.
Ferranti	UMA	R	250 km	44	Development.
FR, Ltd.	Falconet	R, ECM	1.5 h	50	Development.
	Raven	R	110 km	2.5	Development.
GEC Avionics	Phoenix	R, TA	50 km		Entering production for British Army.
ML Aviation	Sprite	R	2.5 h	6	Development.
Vinten	Vindicator	R	5 h	160	Development.
Target Technology	Spectre	R, ECM	1.25 h	15	Development.
United States					
Aerodyne	Pegasus	R	480 km	680	Development.
Aerotronics	Dragonfly	R		31	Development.
Beechcraft	Raider	R, E, ECM	2.6 h	160	Development; prototype flew in 1985.
Boeing	Brave-200	ECM	650 km	50	Development; derived from Pave Tiger program.
E-Systems	E-90	EW, R	3 h	9	Development.
	E-175	EW	4 h	18	Development.
	E-260	R	6 h	22.7	Development.
	E-310	R, EI			Development.
Fairchild	ATM-100	EW	603 km	22.7	Development.
[redacted]					25X1
Lockheed	Altair	R	10 h	45	Development.
	Aquila	R, TA	3.5 h	27	Production to start in 1986 for US Army.
Speery	Relay	C		544	Development.
Ryan	328	R, ECM, E	7 h	13	Developmnent.
	Tactical RPV	R, ECM, EW			Development.

[a] R = Reconnaissance.
ST = Strike.
EI = Electronic intelligence.
TA = Target acquisition.
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[redacted] 25X1